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Animal Rabies Surveillance – 1999

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Office of Surveillance

During 1999, 31 cases of animal rabies were detected in Missouri, compared to 42 cases the previous year, representing a 26 percent decrease. See Figure 1. Animals found to be rabid in Missouri during 1999 included: bats (15 cases); skunks (11 cases); cats (2 cases); horses (1 case); raccoons (1 case); cattle (1 case). The number of specimens tested in 1999 was 2,730, with 31 found positive, giving a positivity rate of 1.14 percent. In 1998, 42 of 2,448 submitted specimens tested positive, yielding a 1.72 percent positivity rate. The annual number of rabies cases during the preceding ten years (1989–1998) ranged from a low of 26 cases in 1996 to a high of 62 cases in 1989. The median number of cases per year during this time period was 31. Rabies is endemic throughout Missouri and the number of cases observed in 1999 appears to represent part of the normal fluctuation of this disease.

Cases of bat rabies occurred throughout the state and most of the incidents in which the bat was speciated involved the Big Brown Bat. The median number of bat rabies cases per year during the preceding ten years was 13. There is not an epidemic of bat rabies in Missouri, although media coverage has increased the notoriety of this animal as a potential vector for rabies. Nationally, rabies in bats accounted for 12.5 percent of all cases of rabies in animals reported in 1998 (most recent data), and the 992 reported cases represented a 3.6 percent increase over those reported in 1997. Over the past 20 years, annual laboratory confirmation of bat rabies in the United States has fluctuated from 600 to 1,000 cases. Rabies is widely distributed throughout the United States, with all states except Alaska, North Dakota, Vermont and Hawaii reporting cases in 1998.

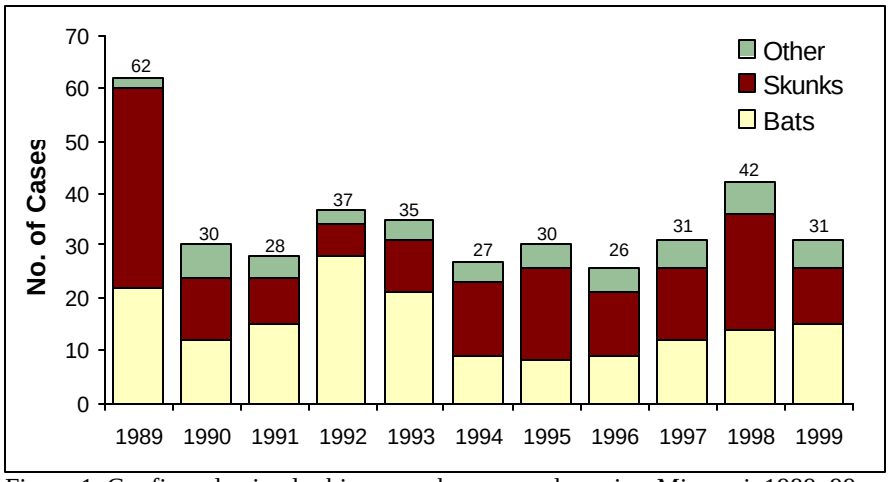

Figure 1. Confirmed animal rabies cases by year and species, Missouri, 1989–99.

In June of 1999, a raccoon that had been kept in an animal care facility in St. Louis County developed symptoms compatible with rabies. The brain was submitted to the Missouri State Public Health Laboratory (SPHL) for rabies testing and results were positive. A brain tissue sample was forwarded to the Kansas State University (KSU) laboratory for rabies virus variant determination. Neither KSU nor the Centers for Disease Control and Prevention (CDC) was able to confirm the positive result obtained by the SPHL (neither KSU nor CDC called the result "negative"). The Missouri Department of Health considers this raccoon to have been rabid since the SPHL's results were obtained using standard tests that have historically provided reliable results for specimens submitted within the state.

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The inability of KSU and CDC to confirm these results could be due to factors such as deterioration of the sample or slight differences in testing techniques due to variations in local circulating strains of rabies virus. This raccoon was most likely infected with a strain of rabies virus endemic to Missouri (e.g., skunk, bat) and not with the eastern strain of raccoon rabies virus.

Data are not currently available concerning the rabies virus variants involved with specimens that tested positive in Missouri during 1999. There is no reason to believe that strains circulating in 1999 differed appreciably from recent previous years. A detailed description of rabies virus variants found in Missouri in 1998 was published in the May-June 1999 issue of the *Missouri Epidemiologist.*

Nationally, the reported number of animal rabies cases was down 6.5 percent from 8,509 cases in 1997 to a total of 7,961 cases in 1998 (latest available data). Wild animals accounted for 7,358 cases or 92.4 percent of all rabies cases. Major types of wild animals infected included raccoons (3,502 cases, 44.0%), skunks (2,272 cases, 28.5%), bats (992 cases, 12.5%), and foxes (435 cases, 5.5%). Other rabid wild animals included 63 groundhogs, 35 mongooses, 35 bobcats, 8 coyotes, 3 beavers, 3 deer, 3 opossums, 2 rabbits, 1 bison, 1 elk, 1 otter, 1 ringtail, and 1 wolf. No further discernible westward extension of the epizootic of rabies in raccoons in Ohio was reported. Domestic animals accounted for 603 (7.6%) of the 7,961 cases seen in 1998. Of that total, 282 cases (3.5%) occurred in cats, 116 cases (1.5%) were seen in cattle, and dogs accounted for 113 cases (1.4%). A total of 82 cases were reported in equidae (horses, donkeys, and mules), which represented a 74.5% increase over the 47 cases reported during 1997 and the greatest number of reported cases in this group of animals since 1981 (88 cases). Other reported cases of rabies in domestic animals included six goats, two sheep, one ferret, and one swine.

Rabies Prevention and Control

- All animal bites should be medically evaluated.
- Keep vaccinations up-to-date for cats, dogs and ferrets.
- Keep pets under supervision so that they do not encounter wildlife.
- Call the local animal control agency to remove stray animals.
- Spay or neuter pets to help reduce the number of unwanted animals.
- Avoid direct contact with unfamiliar animals.

One case of human rabies occurred in the United States during 1998 compared to four cases in 1997. On December 31, 1998, a 29-year-old male inmate at a correctional institution died from rabies encephalitis in Richmond, VA. The man developed symptoms compatible with rabies on December 14 while working on a roadside cleanup crew. His condition worsened over the next two weeks, and samples sent to CDC tested positive for the rabies virus variant associated with silver-haired and eastern pipistrelle bats. Epidemiologic investigations failed to elicit a history of animal bite, although an unnoticed bite sustained during ignored or forgotten contact with a bat remains the most plausible explanation for this infection. This death continued the trend for human deaths from rabies of indigenous origin; it was associated with bat variants of the rabies virus, and it lacked a clear exposure history involving animal bite.

Each potential exposure to rabies should be evaluated by a physician since this disease is almost invariably fatal in humans. See sidebar. Consultation with local or state public health officials may be required to determine the need for rabies prophylaxis. Administration of rabies postexposure prophylaxis (PEP) should be regarded as a medical urgency, not a medical emergency. The following factors should be considered when determining the need for PEP:

- **Type of Exposure—Bite Versus Nonbite:** All bites (penetration of the skin by teeth) constitute a potential exposure, regardless of the bite location. The bites of some animals, such as bats, may go unnoticed because the injury is very minor. Nonbite exposures resulting from encounters with animals include contamination of wounds or mucous membranes with potentially infectious material (e.g., saliva, neural tissue) and exposure to aerosolized rabies virus in caves containing many bats. Although nonbite exposures from terrestrial animals rarely cause rabies, PEP should nonetheless be considered since there are reports of rabies transmission following such incidents.
- **Species of Biting Animal:** The incidence of rabies in dogs and cats varies from one region of the country to another. During the last decade, more cats were found to be rabid than dogs in the United States. Missouri averaged two rabid dogs and one rabid cat annually from 1989–1998. As part of a postexposure assessment, a healthy dog, cat, or ferret may be quarantined for ten days. Rabid bats have been increasingly implicated in the transmission of rabies to humans, possibly through seemingly minor or unrecognized bites. Nationally, wild carnivores such as raccoons, skunks, and foxes are the terrestrial animals

most often found rabid. All bites by such wildlife must be considered as possible exposures. The offspring of wild animals crossbred with domestic dogs and cats are considered wild animals. Small wild and domestic rodents and lagomorphs are very rarely found to be infected with rabies and have not been known to transmit the virus to humans. During 1998, all cases of rabies in rodents and lagomorphs (primarily groundhogs, 63/68 cases) were reported by states in which rabies is enzootic in raccoons.

- **Circumstances of Incident and Vaccination Status of Exposing Animal:** An animal that attacks in an unprovoked fashion is more likely to be rabid than if the incident was provoked. When assessing the variable of unprovoked versus provoked, one must look at the situation from the "perspective" of the animal. That is, bites inflicted when a person enters the animal's home territory or while feeding or handling the animal are usually considered as provoked. Licensed rabies vaccines are available for dogs, cats, ferrets, cattle, horses, and sheep. A currently vaccinated animal is unlikely to become infected with the rabies virus.

Prevention of rabies in pets is essential in maintaining a barrier between the human population and rabid wild animals. All cats, dogs, and ferrets should be immunized, using a vaccine with a three-year duration when available. Vaccines must be administered by a veterinarian in accordance with the specifications of the product label or package insert. Local governments should maintain programs to remove strays and unwanted animals. Preferably, unvaccinated pets exposed to a rabid animal should be euthanized immediately. Collectively, strategies such as these have reduced laboratory-confirmed cases in dogs and cats from 6,226 in 1953 to 395 in 1998 in the United States.

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3. Compendium of animal rabies prevention and control, 2000. Madison, WI: National Association of State Public Health Veterinarians, Inc. 1999.
4. Rules of Department of Economic Development, Division 270—Missouri Veterinary Medical Board, Chapter 4—Minimum Standards, March 31, 1996.

Hepatitis B Vaccine for Newborns

The Missouri Department of Health, the Centers for Disease Control and Prevention (CDC), and the American Academy of Pediatrics (AAP) encourage physicians to administer the first dose of hepatitis B vaccine to newborns, and no later than 2 months of age.

The recommendation is reinstituted because the Food and Drug Administration has approved two preservative-free hepatitis B vaccines:

- Recombivax HB Pediatric (manufactured by Merck Vaccine Division) and
- Engerix B Pediatric (manufactured by Smith-Kline Beecham).

"Resumption of hepatitis B vaccination of newborns is important because confusion about recommendations has resulted in some hospitals failing to immunize newborns delivered to hepatitis B surface antigen positive women. Additionally, data demonstrate that newborns who do not receive hepatitis B vaccine at birth are less likely to complete this series of immunizations," according to Margaret B. Rennels, M.D., F.A.A.P., member of AAP's Committee on Infectious Diseases.

For more information, please call the Section of Vaccine-Preventable and Tuberculosis Disease Elimination, Missouri Department of Health, at (800) 699-2313.

Section for Environmental Public Health 1999 Annual Report

Brian M. Quinn
Section for Environmental Public Health

The Section for Environmental Public Health (SEPH) is a group of highly diverse programs dedicated to protecting the health and well-being of people in Missouri from hazardous environmental contaminants and conditions. SEPH was created from the blending and strengthening of two related bureaus—Environmental Epidemiology and Community Environmental Health—into one comprehensive environmental public health unit. From food safety to childhood lead poisoning prevention, from risk and health assessment to special public health research studies, SEPH's diversity is its strength and service is its mission.

The following report reflects activities and accomplishments from SEPH's second full year of service under the new organization. It should be noted, however, that this annual report does not represent all of SEPH's various programs. There are some programs that, although they provide crucial health protective services across the state, would not be considered epidemiologically based under a strict definition of the term.

SEPH Risk Assessment Programs

SEPH's two risk assessment programs are heavily involved in assessing the risks that hazardous substances in the environment pose to human health. These programs work closely with other state and federal environmental and health agencies, including the U.S. Environmental Protection Agency (EPA), the Missouri Department of Natural Resources (DNR), the federal Agency for Toxic Substances and Disease Registry (ATSDR), the Department of Defense (DOD) and the Department of Energy (DOE). These programs assess human risk through several different kinds of documents that discuss exposure levels, safe clean-up levels and various aspects related to exposure to substances found at hazardous waste sites statewide. An EPA-funded risk assessment involves a quantitative analysis or review of information about a hazardous waste site. This kind of assessment provides a mathematical "best guess" of what will happen if the site is not cleaned up or if the site is only cleaned up to a specific level of contamination, rather than a safe "walk away" level. A state-funded risk assessment provides more generic clean-up guidelines for sites, based on similar but not identical assumptions/formulae to EPA numbers. The information given in the following two subsections reflects extensive research, cooperation, coordination, document review and inter-agency communication by SEPH staff. The average risk assessment may take as long as two months to complete and submit to EPA.

Risk Assessment Program (EPA)

The following activities were completed during 1999:

- Completed two site-specific human health risk assessments
- Reviewed four site-specific human health risk assessments (from another agency or organization)
- Developed safe residual levels/ remediation goals for four sites
- Reviewed 18 site documents for health-related issues
- Attended 21 training courses/conferences
- Attended or gave presentations at five public meetings
- Attended 12 technical site meetings
- Conducted five site visits and/ investigations
- Participated on the Governor's Inter-agency Task Force on Methamphetamines
- Participated on the DNR Risk-Based Approach to Groundwater Committee
- Participated on national risk assessment work groups
- Developed cleanup guidelines for illegal methamphetamine lab properties
- Worked on five projects with assessors from other agencies
- Maintained effective communication and working relationships with numerous local, state, and federal agencies and organizations.

For more information, contact the program at (800) 392-7245.

Risk Assessment Program (State)

The following activities were completed during 1999:

- Reassessed 52 abandoned or uncontrolled hazardous waste sites for their risk to public health.
- Assessed four new abandoned or uncontrolled hazardous waste sites for their risk to public health.
- Analyzed 20 sites to determine if private drinking water wells were impacted by nearby contamination.
- Continued assisting DNR by reassessing the health risks at four Department of Defense sites.
- Provided health information to DNR to assist with its Voluntary Cleanup Program. Sixty-seven of these sites are already cleaned up, while 117 more properties are in the process of cleanup.
- Assisted DNR in developing a guidance document for their Brownfield Redevelopment Program.

For more information, contact the program at (800) 392-7245.

Public Health Assessment Program (ATSDR)

The Public Health Assessment Program is part of a state cooperative agreement with ATSDR to conduct health assess-

ments in Missouri communities near hazardous waste sites. In contrast to EPA and state risk assessments, public health assessments provide a qualitative evaluation of exposures to contaminants at a site and related adverse health effects that could have occurred in the past, are presently occurring, or could occur in the future. These health effects are evaluated by estimating exposures based on site visits, interviews with citizens, community and elected leaders, etc., or based on review of documents such as site investigations, risk assessments, site histories and any other available information about a site. Findings from these assessments are reported through public health assessments and health consultations. These documents are designed to address community concerns, as well as to inform and educate the communities about sites, and help them make decisions about how to protect themselves from exposure to site-related contaminants and resulting adverse health effects. These documents also are used by environmental agencies with regulatory power (e.g., EPA) to help make the most health protective decisions when planning clean-up or remediation actions at a site.

All of these program activities represent a tremendous amount of communication, coordination and cooperation with numerous local, state and federal departments and agencies required to complete the work summarized in this report. SEPH has also been involved in numerous other sites and issues which are currently in the early stages of community and governmental activity and development**.** In 1999, the Public Health Assessment Program:

- Completed three public health assessments.
- Completed 13 health consultations.
- Hosted or attended 13 public availability sessions.
- Visited 15 hazardous waste sites statewide.
- Coordinated one community survey.
- Participated in numerous Community Assistance Group meetings.
- Participated in numerous health education group meetings.
- Provided technical assistance to other agencies.

For more information, contact the program at (800) 392-7245.

Childhood Lead Poisoning Prevention Program

Childhood lead poisoning is one of the most common preventable environmental health problems in the world today. When lead is introduced into the body through ingestion or inhalation, its adverse toxic health effects on young children's developing nervous, hematopoietic and renal systems can range from acute (coma and seizures) to subtle (learning and behavioral problems or anemia). Young children (age 0–72 months) are at greatest risk due to their hand-to-mouth behaviors. Testing, treatment and prevention of access to lead hazards are key elements to finding and, ultimately, eliminating childhood lead poisoning.

Dust and debris from deteriorating lead-based paint in older housing is considered to be the primary contributor to childhood lead poisoning in the United States today. Paint with the highest lead content was used extensively before 1950. In Missouri, pre-1950 housing comprises nearly 29% of all housing stock. Only 27% of the nation's housing stock was built before 1950. Compared to other states, Missouri has the 24th highest percentage of pre-1950 housing.

Studies also show a strong relationship between elevated blood lead levels and income. Logically, the increased likelihood for poorer children to inhabit older, deteriorating housing would be a reasonable conjecture. Centers for Disease Control and Prevention (CDC) data substantiate that children in lower income levels are nearly twice as likely to have elevated blood lead levels when compared to all children tested. See Table 1.

However, any remodeling activities that have the potential to disturb lead-based paint and/or its dust, regardless of a family's income, can produce lead hazards and create the potential for lead poisoning. Consequently, caregivers should be aware of these and other factors, and should assess the potential risk for lead poisoning on a case-by-case basis.

Figure 1 on page 6 shows the percentage of pre-1950 housing by county in Missouri with an overlay of the percentage of children less than 6 years of age who are at or below 185 percent of the poverty level. These indicators identify many counties in Missouri that show a high potential risk for childhood lead poisoning. Analyzing smaller geographic boundaries (such as zip codes, census tracts, etc.) can also identify areas with a high potential risk for lead poisoning that Figure 1 may not depict.

While Missouri has its share of older homes containing lead-based paint and poverty, the state also features areas of contaminated soil in vicinities near lead mines and smelters due to its unique role as the largest producer of lead and lead products in the United States. Other

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Table 1. Percentage of Children Aged 1–5 With Blood Lead Levels ≥10 µg/dl by Income Level, United States, 1991–1994

Income Level	Percent of Children Aged 1–5 With Blood Lead Levels ≥10 µg/dl
Low	8.0%
Middle	1.9%
High	1.0%
All children	4.4%

Source: Centers for Disease Control and Prevention. Screening Young Children for Lead Poisoning: Guidance for State and Local Public Health Officials. November 1997.

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related risk factors include parents employed at lead mines or smelters and/or other lead occupations and hobbies.

There are also other sources of lead hazards such as (the following list is not all-inclusive):

- Improperly glazed or fired pottery and ceramic-ware that when used for food or beverage vessels can leach lead into food
- Mini-blinds
- Lead crystal
- Stained-glass making, artist's paints, crayons (imported), inorganic pigments
- Lead solder (used for welding, e.g., electronics, imported food cans/containers, etc.)
- Lead-cast figurines or jewelry
- Imported candy (wrappers)
- Ammunition, batteries, fishing sinkers
- Traditional medicines and cosmetics including:
  - ASIAN: Chuifon tokuwan, payloo-ah, ghasard, bali goli, kandu
  - MEXICAN: azarcon and greta (also known as liga, Maria Louisa, alarcon, coral, and rueda)
  - MIDDLE EASTERN: alkohl, kohl, surma, saoot, cebagin

During 1999 in Missoui, 46,715 children less than 6 years of age were reported to have been screened for lead poisoning. This figure represents 10 percent of the estimated population of children in this age group, making 1999 the highest year of lead screening activity since the Missouri Department of Health began lead surveillance in 1995. Screening during 1999 increased by 7 percent compared to 1998 (43,591). Figure 2 shows the ranges of lead screening activity by county during 1999.

Of the children tested for lead poisoning during 1999, 5,092 (10.9%) were identified with blood lead elevations≥10 µg/dl (the CDC's level of concern). In comparison to 1998 figures (5,342 elevated/43,591 screened = 12.3%), this represents a 1.4

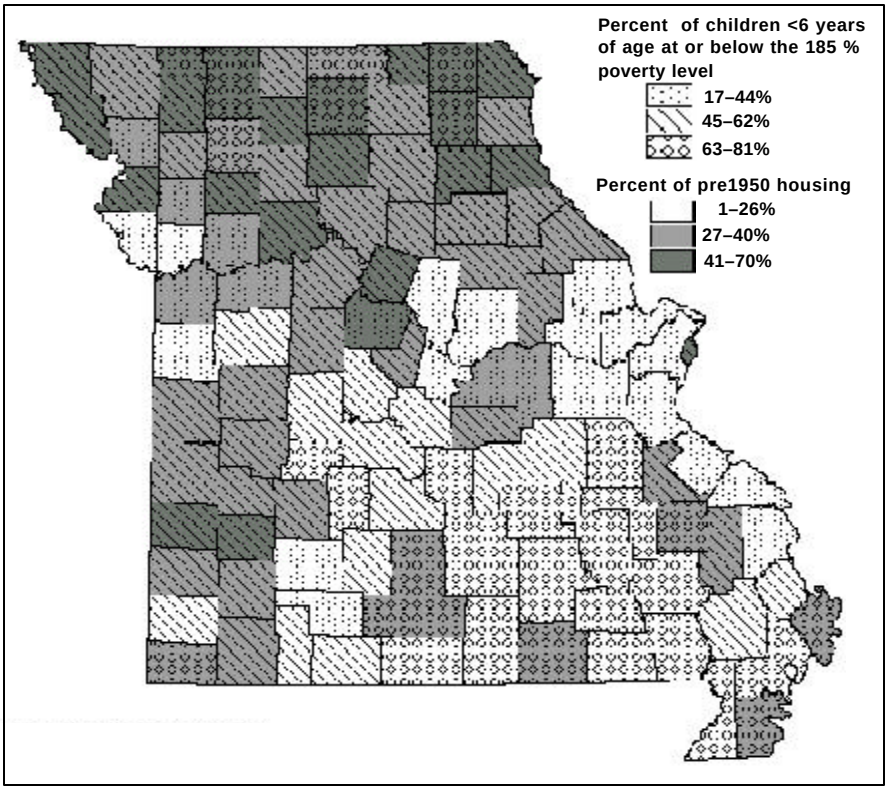

Figure 1. Percentage of pre-1950 housing and percentage of children <6 years of age at or below the 185 percent poverty level by county, Missouri, 1990.

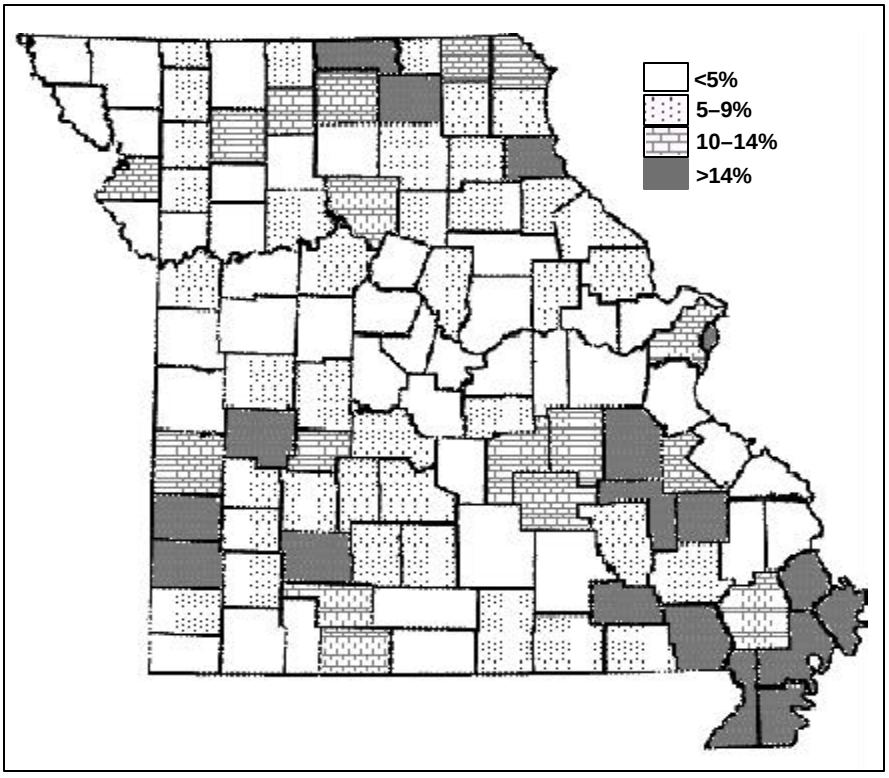

Figure 2. Percentage of children <6 years of age tested for lead poisoning by county, Missouri Childhood Lead Poisoning Prevention Program, 1999.

percent decline in the proportion of children testing at or above the level of concern for lead poisoning. Interestingly, a 1.4 percent decline was also realized during 1998 compared to 1997. However, in comparing the current 10.9 percent Missouri rate to the national rate of 4.4 percent (Table 1), Missouri still has a long way to go before childhood lead poisoning is eradicated. Actual numbers of children tested and elevated by individual county are available by contacting the Missouri Department of Health Childhood Lead Poisoning Prevention Program at (800) 575-9267).

A major function of the Missouri Childhood Lead Poisoning Prevention Program is to increase the number of reported blood lead screenings in order to determine the extent of lead poisoning and its location. Efforts necessary to accomplish this include educating Medicaid Managed Care plans and physicians regarding required blood lead screening during 12- and 24-month well-child visits, encouraging private laboratory reporting, and increasing general public awareness through various media sources. Future efforts will continue to be focused in areas identified to have the greatest potential risk to children based on housing, poverty, screening numbers and lead occupations.

Another primary role of the Missouri Childhood Lead Poisoning Prevention Program is to identify and prevent/eliminate access to environmental lead hazards for children with blood lead levels $\geq$20µg/dl. Home environmental assessments are generally conducted by a public health nurse and a sanitarian trained in lead hazard assessment. They educate the family about specific personal hygiene, such as frequent and thorough handwashing of the child, washing toys, wet mopping to remove lead dust from floors and surfaces where small children play, and good nutrition through a diet high in iron and calcium to prevent bodily absorption of lead. During 1999, 1,097 environmental assessments to detect sources of lead hazards were conducted.

Throughout the state, other lead program efforts include increasing community awareness and involvement in the efforts to eliminate and prevent childhood lead poisoning. Information concerning the level of risk for childhood lead poisoning for local needs assessments play an integral role in this process. For further information, please contact your local public health agency, or call the Childhood Lead Poisoning Prevention Program at (800) 575-9267.

Environmental and Occupational Diseases and Conditions Passive Surveillance System

The section maintains this passive surveillance system to document occupational diseases and environmental health conditions which are required to be reported to the Department of Health by 19 CSR 20-20.020 and 19 CSR 20-20.080. Each year, the surveillance system receives reports on cases of environmental and occupational diseases and conditions that are entered into a database for evaluation and analysis. Cases of lead poisoning in children under 6 years of age are not included in the system because they are tracked by the state's Childhood Lead Poisoning Prevention Program described earlier in this report.

The majority of conditions reported within a given year typically are lead poisoning in adults and lead poisoning in 6 to 17-year-olds. However, final reports for lead poisoning in these two age groups were unavailable for this annual report. Also reported to the surveillance system are acute chemical poisoning (12 cases in 1999) and carbon monoxide poisoning (41 cases in 1999).

For more information, contact the program at (800) 392-7245.

Radiological Health Program

SEPH's Radiological Health Program is responsible for overseeing and regulating sources of ionizing radiation in non-medical settings. These sources are used in many ways, for example in nuclear pharmacies and industrial radiography. The program is also involved in emergency response and environmental radiation activities. Program staff also gather sampling results from radon detectors distributed statewide through county and city public health agencies for testing in their areas, and provide radon information through seminars, displays and public awareness presentations. The Radon Hotline provides Missouri residents easy access to radon information. In 1999, the Radiological Health Program:

- Continued to register and reregister ionizing radiation sources used in non-medical settings:
  - 93 industrial radioactive material users
  - 118 X-ray users
- Performed periodic radiation safety surveys of industrial X-ray and radioactive material registrants.
- Participated in extensive training activities in preparation for emergency events at the Callaway and Cooper nuclear power plants. Training included drills, dress rehearsals and exercises. This year's Callaway exercise was federally evaluated and the section successfully demonstrated the capability to protect public health and safety in the event of a nuclear plant emergency event.
- Responded to four requests for assistance by scrap metal recyclers and landfill operators to locate and characterize radioactive sources.
- Continued to maintain and cultivate close working relationships with local, state and federal agencies and organizations including the Missouri Department of Natural Resources, Environmental Protection Agency, American Lung Association, Missouri Association of School Administrators and the Missouri Public Health Association. These relationships provided opportunities for information exchange, data gathering, coalition building, community outreach and funding.
- Provided radon detectors to county and city public health agencies for

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VIDEOCONFERENCE in 2000

Surveillance of Vaccine-Preventable Diseases

CORRECTED DATE **December 8, 2000**
11:00 a.m.–2:30 p.m. CST

This program will provide guidelines for vaccine-preventable disease surveillance, case investigation and outbreak control.

For more information about the course and site locations, contact the immunization representative located in your district health office or the Section of Vaccine-Preventable and Tuberculosis Disease Elimination at (800) 699-2313.

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testing in their areas. These agencies distributed more than 800 detectors in their areas.

- Responded to approximately 700 phone calls through the Radon Hotline.

For more information, contact the Radon Hotline at (800) 669-7236.

Special Studies

One of SEPH's most important functions is to coordinate and conduct special epidemiological studies that are designed to determine whether and to what extent Missourians are exposed to hazards in the environment. These studies require a tremendous amount of time, effort, coordination, planning, financial resources and personnel. A study can take up to two years or longer to complete from inception to the published final report. The following summarizes special study efforts in 1999:

Missouri Statewide Food Service Survey

The section conducted this survey during September, October and November 1998. Groundwork for the statewide survey was laid by a pilot survey conducted in January 1998 in the department's northeastern health district. The pilot, which included 100 randomly selected food service establishments, was designed to determine if the survey questionnaire and inspection protocol were viable, whether personnel conducting the survey needed additional training, whether the survey would generate useful baseline information, and to identify public health needs in Missouri's food service industry. The statewide survey involved 1,200 food service establishments across the state. Information was collected by questionnaire on the education and training of food service employees, needs for educational/training materials in languages other than English, hepatitis A vaccination levels for food service employees, length of time employed in food service, number of employees, number of meals/customers served, reasons for taking sick days, and the presence of policies and procedures. A regular inspection was conducted at the same time. A final report of survey results was distributed on May 1, 2000. A summary of the survey results was published in the March-April 2000 issue of this newsletter and may be obtained by contacting the Food Program at (800) 392-7245.

Follow-up Missouri Statewide Food Service Survey

The section began a smaller statewide food survey in the fall of 1999. Information was collected by questionnaire on education and training of food service employees, needs for educational/training materials in languages other than English, hepatitis A vaccination levels for food services employees, length of time employed in food service, number of employees, number of meals/customers served, reasons for taking sick days and the presence of policies and procedures. A regular inspection was conducted at the same time. The survey will be completed in 2000. As part of the Department of Health strategic plan, the section will conduct mini-surveys each year for five years. At the end of the five-year period, another large-scale survey will be conducted.

Follow-up Childhood Lead Exposure Study—Jasper County

The section began the groundwork for a follow-up study, funded by ATSDR, in children between the ages of 6 months and 6 years living in the Jasper County designated Superfund area. The study will be conducted in 2000. Results will be compared to those obtained during a lead and cadmium exposure study conducted in Jasper County during 1991. This study is being conducted to determine whether the health education activities and remediation efforts conducted in Jasper County have been effective in reducing blood lead levels in children under 6 years of age.

For more information about these special studies, contact the section at (800) 392-7245.

Disease Reporting

Cases of reportable diseases and conditions should be reported promptly to your local health department, or to the Missouri Department of Health at

(800) 392-0272
(during working hours).
The emergency number is
(573) 751-4674
(for after hours, weekends or holidays).

Missouri Rehabilitation Center Helps Managed Care Providers Control Infectious Diseases

Carol Wilhite
Missouri Rehabilitaion Center

As medical technology improves and we become 'smarter' in our treatment of infectious diseases, we often find diseases getting 'smarter' at resisting treatment. Such is the case with tuberculosis (TB). Once almost eradicated, TB increased dramatically in the early 90s before being brought under control again. However, TB continues to be very problematic in certainpockets of the population in the United States. Worldwide, TB is the most common bacterial disease and one-third of the world's population is infected with this organism. Early diagnosis and modern drug treatments make it possible formost TB patients to be treated right in their home communities at their local healthcare clinics.

In industrialized nations, TB has been declining, but is linked more than ever before to homelessness, inner city poverty and drug abuse. TB poses a major health concern for intravenous drug users, those with HIV infection or AIDS, foreign-born individuals from countries with a high prevalence of disease, the elderly, inmates in correctional facilities, the homeless and minorities. Left untreated, TB can be fatal. Left undiagnosed, TB can become a raging epidemic as it was in the early 1900s.

An increasing number of new patients do not respond well to traditional treatment and, therefore, require admittance to a program specializing in advanced TB treatment. Most states do not have the type of inpatient programs necessary to treat drug-resistant TB. Such treatment environments cannot be created overnight. Isolation rooms with negative airflow filtration systems are expensive to establish, and with antiquated buildings, sometimes impossible to add to existing facilities.

States in the midwest are solving their treatment dilemmas by contracting with the Missouri Rehabilitation Center (MRC). Founded in 1907 as a state TB hospital, MRC has greatly expanded over the years to include a broad range of pulmonary treatments and rehabilitation programs. The original mission, however, has not changed. More than 90 years of experience enables MRC to provide specialized treatment, acute care nursing, nutritional support, therapy and education for TB patients in Missouri and surrounding states.

The Missouri Department of Health's TB laboratory is housed at MRC and plays a crucial role in the center's continued leadership in this field. The laboratory has been the site of multiple research projects for in-state and out-of-state agencies.

The Missouri Rehabilitation Center is a member of the University of Missouri Health Sciences Center. Physicians not only care for patients; they are also educators and researchers. They are up-to-date on the latesttechnology and medical treatments, which ultimately leads to better patient care.

TB treatment facilities are state-of-the-art and include an isolation wing with private and semi-private rooms as well as a non-isolation wing. Patients at MRC receive services from a whole team of rehabilitation professionals. A full-service radiology department, a respiratory therapy department and a full spectrum of other rehabilitationservices enable MRC to successfully treat TB patients with multiple medical problems.

MRC accepts Medicare, Medicaid and private insurance. A slidingscale means test may be applied to any balance not covered by Medicare or insurance. After financial information is provided, patients are charged according to their ability to pay as determined by the scale. MRC is a Diagnostic Regulatory Guideline (DRG)-exempt facility. No one will be denied admission because of inability to pay. Contracts may include transportation costs, housing for family members, and more. No two cases are identical; therefore, each contract is individually prepared.

Treatment plans, compliance reports, progress reports and anydocumentation or communication desired by the referral source is provided promptly by medical staff. Health-care professionals today are required to provide high quality healthcare at rock bottom prices. After exploring the options, many providers are turning to MRC for that care.

MRC can treat even the most difficult TB cases. Persons who are court-ordered to receive TB treatment are usually successfully rehabilitated at MRC. When ready for discharge, staff members work closely with the state's TB Control Program to develop appropriate discharge plans for those patients.

For more information, please contact:
Missouri Rehabilitation Center
600 N. Main St.
Mt. Vernon, MO 65712
Ph: (417) 466-3711
http://www.muhealth.org/~rehab
Email: askmrc@health.missouri.edu

Erratum:
We apologize for omitting the names of staff of the St. Louis City Department of Health who contributed to the article entitled Primary Multidrug-Resistant Tuberculosis in St. Louis City, 1997-99 published in the January–February 2000 issue of the *Missouri Epidemiologist*. Those St. Louis City staff who contributed to this article included Don Weiss, M.D., M.P.H. and Rose Ann Rook, R.N. The authors of the article were Dr. Weiss, Lynelle Phillips and Rose Ann Rook.

State Public Health Laboratory - 1999 Annual Report

Metabolic Disease Screening

Infants screened 77,625
Presumptive positives:
- PKU 5
- Hypothyroidism 32
- Galactosemia 20
- Sickle Cell 22
- Other hemoglobinopathies 1,383

Serology/Virology

HIV Serology 73,264
- HIV antibody positive 558

Syphilis Serology 28,833
Sero-confirmed reactive 706

Hepatitis A Serology 647
- Positive 71

Hepatitis B Serology 7,124
- Positive 94

Measles, Mumps and Rubella (Diagnostic Serologies) 6,973
- Measles (IgM positive) 2
- Mumps (significant rise in titer) 1
- Rubella (IgM positive) 3
- Prenatal rubella screens 6,910
  - Nonreactive patients 860

Viral Isolation 1,934
- Influenza isolates 277
- Enterovirus isolates 6
- Herpes isolates 446

Rabies 2,735
- Positive specimens 34

Microbiology

Enterics 2,242
- *Salmonella* 654
- *Shigella* 369
- *Campylobacter jejuni* 13
- *E. coli* O157:H7 73

Parasitology 4,062
- Ova/parasites found 1,327

Reference Bacteriology 1,606
- *Francisella tularensis* 3
- *Haemophilus influenzae* 14
- *Neisseria meningitidis* 47
- *Bordetella pertussis* 74

DNA Probe for Chlamydia/Gonorrhea 66,066
- *N. gonorrhoeae* 1,314
- *Chlamydia trachomatis* 3,266

Tuberculosis 9,949
- Positive Cultures 732

Environmental Testing

Chemistry 15,803
- Blood lead samples 14,486
- Total analyses 23,569
- Blood lead ≥20µg/dL 197
- Environmental lead samples 254

Bacteriology—Water

Private Samples 12,443
- Coliform positive 4,395

Public Supplies 62,271
- Coliform positive 2,797
- *E. coli*/fecal coliform positive 214

Swimming Pools 1,529

Food/Dairy/Beverage 3,805
- Excessive bacteria, coliform, yeast and mold 146

Exposure to Blood

What Health-Care Workers Need to Know

Reprint of a publication from the Centers for Disease Control and Prevention's Hospital Infections Program and Division of Viral and Rickettsial Diseases. This publication is available in PDF format on the World Wide Web at http://www.cdc.gov/ncidod/hip/Blood/Exp_to_Blood.pdf. To purchase copies of the document, contact the Public Health Foundation at (877) 252-1200 (toll free) or at http://bookstore.phf.org/

OCCUPATIONAL EXPOSURES TO BLOOD

Introduction

Health-care workers are at risk for occupational exposure to bloodborne pathogens, including hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV). Exposures occur through needlesticks or cuts from other sharp instruments contaminated with an infected patient's blood or through contact of the eye, nose, mouth, or skin with a patient's blood. Important factors that may determine the overall risk for occupational transmission of a bloodborne pathogen include the number of infected individuals in the patient population, the chance of becoming infected after a single blood contact from an infected patient, and the type and number of blood contacts.

Most exposures do not result in infection. Following a specific exposure, the risk of infection may vary with factors such as these:

- The pathogen involved
- The type of exposure
- The amount of blood involved in the exposure
- The amount of virus in the patient's blood at the time of exposure

Your employer should have in place a system for reporting exposures in order to quickly evaluate the risk of infection, inform you about treatments available to help prevent infection, monitor you for side effects of treatments, and to determine if infection occurs. This may involve testing your blood and that of the source patient and offering appropriate postexposure treatment.

How can occupational exposures be prevented?

Many needlesticks and other cuts can be prevented by using safer techniques (e.g., not recapping needles by hand), disposing of used needles in appropriate sharps disposal containers, and using medical devices with safety features designed to prevent injuries. Many exposures to the eyes, nose, mouth, or skin can be prevented by using appropriate barriers (e.g., gloves, eye and face protection, gowns) when contact with blood is expected.

IF AN EXPOSURE OCCURS

What should I do if I am exposed to the blood of a patient?

1. Immediately following an exposure to blood:
   - Wash needlesticks and cuts with soap and water
   - Flush splashes to the nose, mouth, or skin with water
   - Irrigate eyes with clean water, saline, or sterile irrigants

No scientific evidence shows that using antiseptics or squeezing the wound will reduce the risk of transmission of a bloodborne pathogen. Using a caustic agent such as bleach is not recommended.

2. Following any blood exposure you should:

Report the exposure to the department (e.g., occupational health, infection control) responsible for managing exposures. Prompt reporting is essential because, in some cases, postexposure treatment may be recommended and it should be started as soon as possible.

Discuss the possible risks of acquiring HBV, HCV, and HIV and the need for postexposure treatment with the provider managing your exposure. You should have already received hepatitis B vaccine, which is extremely safe and effective in preventing HBV infection.

RISK OF INFECTION AFTER EXPOSURE

What is the risk of infection after an occupational exposure?

HBV

Health-care workers who have received hepatitis B vaccine and have developed immunity to the virus are at virtually no risk for infection. For an unvaccinated person, the risk from a single needlestick or a cut exposure to HBV-infected blood ranges from 6–30% and depends on the hepatitis B e antigen (HBeAg) status of the source individual. Individuals who are both hepatitis B surface antigen (HBsAg) positive and HBeAg positive have more virus in their blood and are more likely to transmit HBV.

HCV

Based on limited studies, the risk for infection after a needlestick or cut exposure to HCV-infected blood is approximately 1.8%. The risk following a blood splash is unknown, but is believed to be very small; however, HCV infection from such an exposure has been reported.

HIV

- The average risk of HIV infection after a needlestick or cut exposure to HlV-infected blood is 0.3% (i.e., three-tenths of one percent, or about 1 in 300). Stated another way, 99.7% of needlestick/cut exposures do not lead to infection.
- The risk after exposure of the eye, nose, or mouth to HIV-infected blood is estimated to be, on average, 0.1% (1 in 1,000).
- The risk after exposure of the skin to HlV-infected blood is estimated to be less than 0.1%. A small amount of blood on intact skin probably poses no risk at all. There have been no documented cases of HIV transmission due to an exposure involving a small amount of blood on intact skin (a few drops of blood on skin for a short period of time). The risk may be higher if the skin is damaged (for example, by a recent cut) or if the contact involves a large area of skin or is prolonged (for example, being covered in blood for hours).

How many health-care workers have been infected with bloodborne pathogens?

HBV

The annual number of occupational infections has decreased sharply since hepatitis B vaccine became available in 1982 (i.e., there has been a 90% decrease in the number of estimated cases from 1985 to1996). Nonetheless, approximately 800 health-care workers become infected with HBV each year following an occupational exposure.

HCV

There are no exact estimates on the number of health-care workers occupationally infected with HCV. However, studies have shown that 1% of hospital health-care workers have evidence of HCV infection (about 1.8% of the U.S. population has evidence of infection). The number of these workers who may have been infected through an occupational exposure is unknown.

HIV

As of December 1998, CDC had received reports of 54 documented cases and 134 possible cases of occupationally acquired HIV infection among health-care workers in the United States since reporting began in 1985.

TREATMENT FOR THE EXPOSURE

Is vaccine or treatment available to prevent infections with bloodborne pathogens?

HBV

As mentioned above, hepatitis B vaccine has been available since 1982 to prevent HBV infection. All health-care workers who have a reasonable chance of exposure to blood or body fluids should receive hepatitis B vaccine. Vaccination ideally should occur during the health-care worker's training period. Workers should be tested 1–2 months after the vaccine series to make sure that vaccination has provided immunity to HBV infection.

Hepatitis B immune globulin (HBIG) is effective in preventing HBV infection after an exposure. The decision to begin treatment is based on several factors, such as:

- Whether the source individual is positive for hepatitis B surface antigen.
- Whether you have been vaccinated.
- Whether the vaccine provided you immunity.

HCV

There is no vaccine against hepatitis C, and no treatment after an exposure that will prevent infection. Immune globulin is not recommended. For these reasons, following recommended infection control practices is imperative.

HIV

There is no vaccine against HIV. However, results from a small number of studies suggest that the use of zidovudine after certain occupational exposures may reduce the chance of HIV transmission.

Postexposure treatment is not recommended for all occupational exposures to HIV because most exposures do not lead to HIV infection and because the drugs used to prevent infection may have serious side effects. Taking these drugs for exposures that pose a lower risk for infection may not be worth the risk of the side effects. You should discuss the risks and side effects with a health-care provider before starting postexposure treatment for HIV.

What about exposures to blood from an individual whose infection status is unknown?

HBV–HCV–HIV

If the source individual cannot be identified or tested, decisions regarding follow-up should be based on the exposure risk and whether the source is likely to be a person who is infected with a bloodborne pathogen. Follow-up testing should be available to all workers who are concerned about possible infection through occupational exposure.

What specific drugs are recommended for postexposure treatment?

HBV

If you have not been vaccinated, then hepatitis B vaccination is recommended for any exposure regardless of the source person's hepatitis B status. HBIG and/or hepatitis B vaccine may be recommended depending on your immunity to hepatitis B and the source person's infection status.

HCV

Currently there is no recommended postexposure treatment that will prevent HCV infection.

HIV

The Public Health Service recommends a 4-week course of two drugs (zidovudine and lamivudine) for most HIV exposures, or zidovudine and lamivudine plus a protease inhibitor (indinavir or nelfinavir) for exposures that may pose a greater risk for transmitting HIV (such as those involving a larger volume of blood with a larger amount of HIV or a concern about drug-resistant HIV). Differences in side effects associated with the use of these two drugs may influence which drug is selected in a specific situation.

These recommendations are intended to provide guidance to clinicians and may be modified on a case-by-case basis. Determining which drugs and how many drugs to use or when to change a treatment regimen is largely a matter of judgement. Whenever possible, consulting an expert with experience in the use of antiviral drugs is advised, especially if a recommended drug is not available, if the source patient's virus is likely to be resistant to one or more recommended drugs, or if the drugs are poorly tolerated.

How soon after exposure to a bloodborne pathogen should treatment start?

HBV

Postexposure treatment should begin as soon as possible after exposure, preferably within 24 hours, and no later than 7 days.

HIV

Treatment should be started promptly, preferably within hours as opposed to days, after the exposure. Although animal studies suggest that treatment is not effective when started more than 24–36 hours after exposure, it is not known if this time frame is the same for humans. Starting treatment after a longer period (e.g., 1–2 weeks) may be considered for the highest risk exposures; even if HIV infection is not prevented, early treatment of initial HIV infection may lessen the severity of symptoms and delay the onset of AIDS.

Has the FDA approved these drugs to prevent blood-borne pathogen infection following an occupational exposure?

HBV

Yes. Both hepatitis B vaccine and HBIG are approved for this use.

HIV

No. The FDA has approved these drugs for the treatment of existing HIV infection, but not as a treatment to prevent infection. However, physicians may prescribe any approved drug when, in their professional judgment, the use of the drug is warranted.

What is known about the safety and side effects of these drugs?

HBV

Hepatitis B vaccine is very safe. There is no information that the vaccine causes any chronic illnesses. Most illnesses reported after an HBV vaccination are often related to other causes and not the vaccine. However, you should report any unusual reaction after a hepatitis B vaccination to your health-care provider.

HIV

All of the antiviral drugs for HIV have been associated with side effects. The most common side effects include upset stomach (nausea, vomiting, diarrhea), tiredness, or headache. The few serious side effects that have been reported in health-care workers using combination postexposure treatment have included kidney stones, hepatitis, and suppressed blood cell production. Protease inhibitors (indinaivir and nefinavir) may interact with other medicines and cause serious side effects and should not be used in combination with certain other drugs, such as prescription antihistamines. It is important to tell the health-care provider managing your exposure about any medications you are currently taking, if you need to take antiviral drugs for an HIV exposure.

Can pregnant health-care workers take the drugs recommended for postexposure treatment?

HBV

Yes. Women who are pregnant or breast feeding can be vaccinated against HBV infection and/or get HBIG. Pregnant women who are exposed to blood should be vaccinated against HBV infection, because infection during pregnancy can cause severe illness in the mother and a chronic infection in the newborn. The vaccine does not harm the fetus.

HIV

Pregnancy should not rule out the use of postexposure treatment when it is warranted. If you are pregnant you should understand what is known and not known regarding the potential benefits and risks associated with the use of antiviral drugs in order to make an informed decision about treatment.

FOLLOW-UP AFTER AN EXPOSURE

What follow-up should be done after an exposure?

HBV

Because postexposure treatment is highly effective in preventing HBV infection, CDC does not recommend routine follow-up after treatment. However, any symptoms suggesting hepatitis (e.g., yellow eyes or skin, loss of appetite, nausea, vomiting, fever, stomach or joint pain, extreme tiredness) should be reported to your health-care provider.

HCV

You should have an antibody test for hepatitis C virus and a liver enzyme test (alanine aminotransferase activity) as soon as possible after the exposure (baseline) and at 4-6 months after the exposure. Some clinicians may also recommend another test (HCV RNA) to detect HCV infection 4-6 weeks after the exposure. Report any symptoms suggesting hepatitis (mentioned above) to your health-care provider.

HIV

You should be tested for HIV antibody as soon as possible after exposure (baseline) and periodically for at least 6 months after the exposure (e.g., at 6 weeks, 12 weeks, and 6 months).

If you take antiviral drugs for postexposure treatment, you should be checked for drug toxicity by having a complete blood count and kidney and liver function tests just before starting treatment and 2 weeks after starting treatment.

You should report any sudden or severe flu-like illness that occurs during the follow-up period, especially if it involves fever, rash, muscle aches, tiredness, malaise, or swollen glands. Any of these may suggest HIV infection, drug reaction, or other medical conditions.

You should contact the health-care provider managing your exposure if you have any questions or problems during the follow-up period.

What precautions should be taken during the follow-up period?

HBV

If you are exposed to HBV and receive postexposure treatment, it is unlikely that you will become infected and pass the infection on to others. No precautions are recommended.

HCV

Because the risk of becoming infected and passing the infection on to others after an exposure to HCV is low, no precautions are recommended.

HIV

During the follow-up period, especially the first 6–12 weeks when most infected persons are expected to show signs of infection, you should follow recommendations for preventing transmission of HIV. These include not donating blood, semen, or organs and not having sexual intercourse. If you choose to have sexual intercourse, using a condom consistently and correctly may reduce the risk of HIV transmission. In addition, women should consider not breast-feeding infants during the follow-up period to prevent exposing their infants to HIV in breast milk.

Selected Web Sites Providing Additional Information on Prevention of Infections in Health-Care Settings

CDC. **Hospital Infections Program**
http://www.cdc.gov/ncidod/hip/

CDC. **Hospital Infections Program: Bloodborne Pathogens** (Includes information and guidelines on HIV, hepatitis B, and hepatitis C.)
http://www.cdc.gov/ncidod/hip/BLOOD/blood.htm

CDC. **Hospital Infections Program: Guidelines & Recommendations** (Includes guidelines for prevention of healthcare-associated infections)
http://www.cdc.gov/ncidod/hip/Guide/guide.htm

HIV/AIDS Treatment Information Service (ATIS). **Treatment Guidelines: Health-Care Worker Exposure Guidelines**
http://hivatis.org/trtgdlns.html

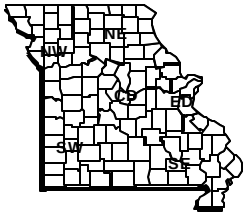
American Academy of Pediatrics (AAP). **Policy Statement: Infection Control in Physicians' Offices (RE9962)**, June 2000
http://www.aap.org/policy/re9962.html

Missouri Department of Health**. Infection Control Guidelines for Long Term Care Facilities**
http://www.health.state.mo.us/Publications/ICtableconts.html

Association for Professionals in Infection Control and Epidemiology (APIC)
http://www.apic.org/

Occupational Safety and Health Administration (OSHA)
http://www.osha.gov/

PEPLine (National Clinician's Post-Exposure Prophylaxis Hotline) 1-888-HIV-4911 (448-4911)
(24-hour, seven days a week, free emergency hotline for clinicians who need advice on treating patients who have suffered occupational exposures to blood; staffed by University of California, San Francisco health care providers at San Francisco General Hospital)
http://epi-center.ucsf.edu/PEP/pepline.html



Missouri Department of Health
Division of Environmental Health and Communicable Disease Prevention

QUARTERLY DISEASE REPORT

Reporting Period*
October - December 1999

	Districts											3 Month State Totals		Cumulative		
	CD	** ED	NE	** NW	SE	** SW	*** OTHER	Kansas City	St. Louis City	St. Louis Co.	Spfd. Greene Co.	1999	1998	For 1999	For 1998	5 YR MEDIAN
Vaccine Preventable																
Influenza	151	189	47	20	101	44	0	3	243	506	87	1391	15	2337	1089	283
Measles	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2
Mumps	0	0	0	0	0	0	0	0	0	0	0	0	1	1	4	10
Pertussis	11	0	2	1	2	1	0	3	1	0	2	23	21	75	59	63
Viral Hepatitis																
A	12	32	1	43	23	14	1	23	62	113	9	333	99	712	637	1151
B	4	3	1	10	1	10	0	2	27	22	2	82	66	224	252	360
C	1	0	0	1	0	1	2	0	1	1	1	8	4	35	14	n/a
Non-A Non-B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	n/a
Unspecified	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	n/a
Meningitis																
Meningococcal Disease	1	1	0	1	0	3	0	0	0	3	0	9	7	45	25	43
Meningococcal Other	0	1	0	2	0	1	0	1	0	4	1	10	7	49	55	41
Enteric Infections																
Campylobacter	16	11	9	20	16	13	0	10	1	18	4	118	136	569	535	574
E. Coli O157:H7	3	1	0	2	1	1	0	0	0	3	0	11	18	47	55	55
Salmonella	22	17	1	29	31	22	3	9	6	27	11	178	140	764	632	577
Shigella	6	17	12	3	0	18	1	4	6	38	8	113	123	720	221	387
Parasitic Infections																
Cryptosporidiosis	1	1	0	0	2	1	0	0	1	1	1	8	9	26	29	33
Giardiasis	32	27	21	21	8	10	0	9	31	36	3	198	228	807	790	777
Respiratory Diseases																
Legionellosis	0	1	0	1	0	0	0	0	1	1	0	4	4	22	18	19
Sexually Transmitted																
AIDS	7	8	1	10	4	5	6	30	43	27	1	142	144	461	489	155
HIV Infection	7	8	1	6	4	3	9	37	24	10	2	111	107	421	489	n/a
Chlamydia	333	89	79	178	238	358		583	866	802	159	3526	3272	13355	12670	12257
Gonorrhea	116	21	29	49	124	54		494	794	518	34	2199	2780	8187	9463	8415
P & S syphilis	2	1	0	0	4	0		0	15	2	0	24	28	99	109	118
Tuberculosis																
TB Disease	3	2	0	5	7	11	3	18	17	4	8	78	63	208	184	n/a
TB Infections	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Zoonotic																
Ehrlichiosis	4	0	0	0	21	0	0	0	2	4	0	31	2	56	12	12
Lyme Disease	2	0	0	0	6	4	0	0	0	1	0	13	1	72	12	52
Rabies (Animal)	0	0	0	2	2	0	0	0	2	0	0	6	11	31	42	30
Rocky Mountain Spotted Fever	0	0	0	0	0	0	0	1	0	1	0	2	1	16	5	22
Tularemia	0	1	1	1	1	0	0	0	0	0	0	4	1	19	12	18

Outbreaks
Foodborne - 1
Waterborne - 1
Hepatitis A - 3
Salmonella -1
Influenza or Flu-Like - 5
Scabies
Group A Strep - 1
Other - 6

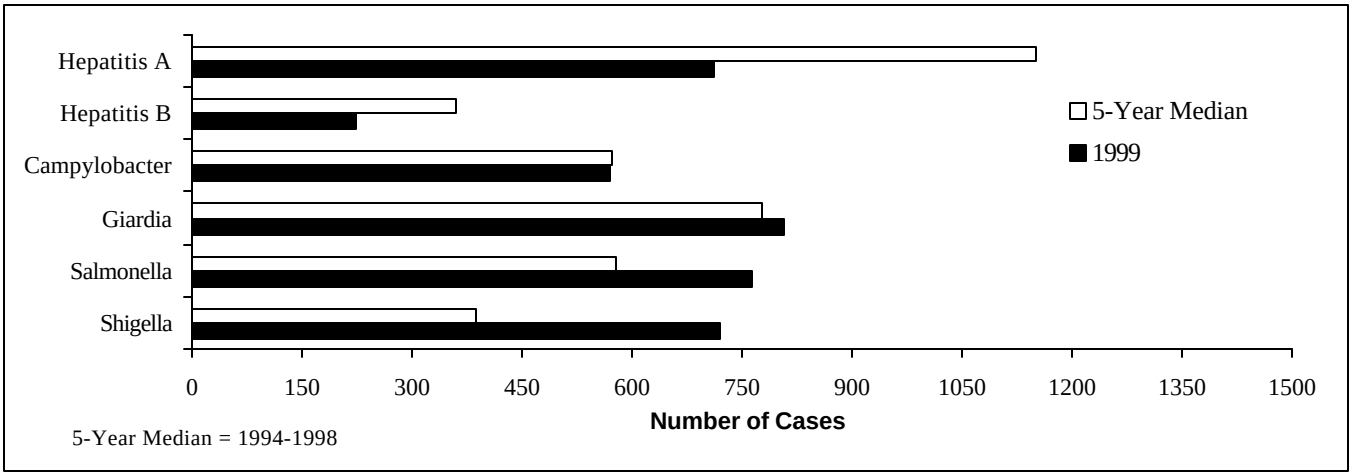
Low Frequency Vaccine Preventable Diseases
Diphtheria
Hib Meningitis - 8
Hib other invasive
Polio
Rubella -
Tetanus

Low Frequency Diseases
Anthrax
Botulism
Brucellosis
Chancroid
Cholera
Encephalitis
Granuloma Inguinale
Kawasaki Disease
Leptospirosis
Listeria - 4
Lymphogranuloma Venereum
Plague
Psittacosis
Rabies (human)
Reye syndrome
Rheumatic fever, acute
Streptococcal Disease, Invasive, Grp A
Streptococcus pneumoniae, Drug Resistant Invasive Disease
Toxic Shock Syndrome
Trichinosis
Typhoid Fever

*Reporting Period Beginning October 3, 1999 and Ending January 1, 2000.
**Totals do not include Kansas City, St. Louis City, St. Louis County, or Springfield
***State and Federal Institutions and Unknown
****Included in SW District
n/a Data unavailable

TEAR OUT FOR FUTURE REFERENCE

Disease Reports, January–December 1999 and 5-Year Median



Influenza

During the January–December 1999 time period, influenza cases increased to 2337 cases, which is a 114.6% increase from the 1089 cases reported in 1998. This is a 725.8% increase from the five-year median of 283. All six health districts showed an increase in influenza cases. During the 99-00 influenza season, new rapid testing methods were licensed. We believe patient and physician acceptance of the new testing method was high, accounting for the increase in laboratory-confirmed cases.

Viral Hepatitis

During the January–December 1999 time period, hepatitis A cases increased to 712 cases, which is a 11.8% increase from the 637 cases reported in 1998. This is a 38.1% decline from the five-year median of 1151. The number of cases increased in the Eastern and Southeastern Districts from 1998 to 1999. The increase in Eastern and Southeastern Districts was due to outbreaks.

Hepatitis B decreased 11.1% from 252 cases in 1998 to 224 cases in 1999. However, the total of 1999 cases was 37.8% lower than the five-year median of 360.

Enterics

Campylobacter increased slightly by 6.4% during 1999, from 535 cases in 1998 to 569 cases in 1999. The total number of 1999 cases declined 0.9% from the five-year median of 574 cases. Salmonella increased by 20.9% from 632 cases in 1998 to 764 cases in 1999. Five of the six health districts showed an increase in salmonella cases with outbreaks in four of the six districts. The four districts were Northwest, Southwest, Eastern and Central. Shigellosis cases increased significantly from 221 in 1998 to 720 in 1999. This is a 225.8% increase. The 720 cases represent a 86.0% increase from the five-year median. Five of the six health districts showed an increase in shigellosis cases with outbreaks in four of the six districts. The four districts were Northwest, Southwest, Southeast, and Central. Eastern District increased 212.6% from 119 cases in 1998 to 372 cases in 1999. Southwestern District increased 378.9% from 38 cases in 1998 to 182 cases in 1999.

Parasites

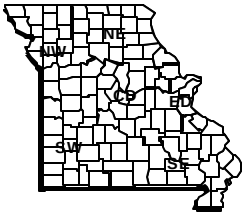
Giardiasis increased slightly by 2.2% during 1998, from 790 cases in 1998 to 807 cases in 1999. However, this is a slight 3.9% decrease from the five-year median of 777 cases.

Meningitis

Meningococcal meningitis increased 80.0% during 1999, from 25 cases in 1998 to 45 cases in 1999. The five-year median is 43 cases. No meningococcal disease outbreaks were reported. Sporadic cases were reported.

HIB Disease

Following no cases reported in 1996, one case reported in 1997, two cases reported in 1998, twelve cases of *Haemophilus influenzae* type b (Hib) meningitis were reported in Missouri during 1999. The five-year median is 2 cases. Other invasive cases (non-meningitis) of *Haemophilus influenzae* that may not be affected by the vaccine decreased 80.0% during 1999 from 10 cases in 1998 to 2 cases in 1999. The five year median is also 10 cases.



Missouri Department of Health
Division of Environmental Health and Communicable Disease Prevention

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Reporting Period*
January - March, 2000

	Districts											3 Month State Totals		Cumulative		
	CD	** ED	NE	** NW	SE	** SW	*** OTHER	Kansas City	St. Louis City	St. Louis Co.	Spfd. Greene Co.	2000	1999	For 2000	For 1999	5 YR MEDIAN
Vaccine Preventable																
Influenza	241	213	116	211	373	56	2	26	156	523	80	1997	757	1997	757	256
Measles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Mumps	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
Pertussis	0	0	0	3	1	1	0	0	0	1	0	6	10	6	10	9
Viral Hepatitis																
A	7	5	0	23	10	14	2	27	35	34	2	159	125	159	125	196
B	1	8	2	5	1	3	13	4	21	8	3	69	37	69	37	70
C	2	0	1	4	0	0	0	0	1	0	2	10	16	10	16	3
Non-A Non-B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Unspecified	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Meningitis																
Meningococcal Disease	1	0	0	2	0	3	1	1	0	1	0	9	17	9	17	17
Meningococcal Other	1	1	0	2	0	2	1	2	3	8	1	21	11	21	11	13
Enteric Infections																
Campylobacter	19	6	2	4	3	19	1	9	3	9	3	78	86	78	86	86
E. Coli O157:H7	4	10	0	2	2	3	0	0	0	0	1	22	2	22	2	2
Salmonella	16	4	1	9	7	10	3	10	3	17	4	84	86	84	86	86
Shigella	4	2	3	11	16	9	4	28	17	25	5	124	120	124	120	120
Parasitic Infections																
Cryptosporidiosis	0	0	0	1	0	0	0	4	1	0	0	6	3	6	3	3
Giardiasis	11	19	8	13	6	18	10	6	29	36	3	159	127	159	127	133
Respiratory Diseases																
Legionellosis	0	0	0	0	1	1	0	0	0	1	0	3	4	3	4	4
Sexually Transmitted																
AIDS	5	1	1	4	3	3	9	28	27	11	3	95	85	95	85	116
HIV Infection	5	2	1	2	2	3	1	23	19	11	1	70	91	70	91	n/a
Chlamydia	273	124	89	175	254	334		903	624	583	179	3361	3461	3361	13355	12257
Gonorrhea	106	12	13	37	125	57		669	557	379	42	1956	1914	1956	8187	8415
P & S syphilis	0	1	0	0	1	0		0	4	9	0	15	31	15	99	118
Tuberculosis																
TB Disease	6	2	0	1	3	1	0	12	11	13	1	50	40	50	40	n/a
TB Infections	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Zoonotic																
Ehrlichiosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lyme Disease	1	4	0	2	0	0	0	0	0	0	0	7	5	7	5	5
Rabies (Animal)	0	0	1	1	1	0	0	0	0	0	0	3	6	3	6	8
Rocky Mountain Spotted Fever	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0
Tularemia	0	0	0	0	0	2	0	0	0	0	0	2	0	2	0	0

Outbreaks
Foodborne
Waterborne
Hepatitis A
Shigella - 1
Influenza or Flu-Like - 3
Scabies - 2
Group A Strep - 1
Other - 7

Low Frequency Vaccine Preventable Diseases
Diphtheria
Hib Meningitis - 3
Hib other invasive
Polio
Rubella -
Tetanus

Low Frequency Diseases
Anthrax
Botulism
Brucellosis
Chancroid
Cholera
Encephalitis
Granuloma Inguinale
Kawasaki Disease
Leptospirosis
Listeria - 1
Lymphogranuloma Venereum
Plague
Psittacosis
Rabies (human)
Reye syndrome
Rheumatic fever, acute
Streptococcal Disease, Invasive, Grp A
Streptococcus pneumoniae, Drug Resistant Invasive Disease
Toxic Shock Syndrome -1
Trichinosis - 1
Typhoid Fever

*Reporting Period Beginning January 2, 2000 and Ending April 1, 2000.
**Totals do not include Kansas City, St. Louis City, St. Louis County, or Springfield
***State and Federal Institutions and Unknown
****Included in SW District
n/a Data unavailable

Due to data editing, totals may change.

TEAR OUT FOR FUTURE REFERENCE

Update: Pulmonary Hemorrhage/Hemosiderosis Among Infants—Cleveland, Ohio, 1993–1996

Reprinted from the Centers for Disease Control and Prevention (CDC) Morbidity and Mortality Weekly Report, March 10, 2000, Vol. 49, No. 9.

A review within the Centers for Disease Control and Prevention (CDC) and by outside experts of an investigation of acute pulmonary hemorrhage/hemosiderosis in infants has identified shortcomings in the implementation and reporting of the investigation described in *MMWR*[1–2] and detailed in other scientific publications authored, in part, by CDC personnel.[3–5] The reviews led CDC to conclude that a possible association between acute pulmonary hemorrhage/hemosiderosis in infants and exposure to molds, specifically *Stachybotrys chartarum*, commonly referred to by its synonym *Stachybotrys atra*, was not proven. This report describes the specific findings of these internal and external reviews.

Background

In December 1994 and January 1997, articles in *MMWR* described a cluster of 10* infants from Cleveland, Ohio, with acute idiopathic pulmonary hemorrhage, also referred to as pulmonary hemosiderosis.[1–2] The children resided in seven contiguous postal tracts and had had one or more hemorrhagic episodes, resulting in one death, during January 1993–December 1994. Preliminary results of a CDC case-control study[2] indicated that hemorrhage was associated with

1. Major household water damage during the six months before illness and
2. Increased levels of measurable household fungi, including the toxin-producing mold *S. chartarum* (syn. *S. atra*).

* The first report[1] described eight infants identified through November 1994. Two additional infants, identified in December 1994, were added to the original study.

These findings and the observation that tricothecene mycotoxins were produced in the laboratory by some *S. chartarum* isolates recovered from the homes of study subjects have been published and referenced in peer-reviewed scientific literature.[3–9] The hypothesis from the findings of the investigation was that infant pulmonary hemorrhage may be caused by exposure to potent mycotoxins produced by *S. chartarum* or other fungi growing in moist household environments.[4–5] The findings also were cited in environmental health guidelines[10–11], congressional testimony[12], and the popular media[13–16], and have been debated among industrial hygienists and other occupational and environmental health scientists.[17–21] Despite caution that "further research is needed to determine...causal[*ity*][4]," the findings have influenced closure of public buildings, cleanup and remediation, and litigation.[16, 22–28]

In June 1997, a CDC scientific task force, in a review of the agency's response to the problem, advised the CDC director that concerns about the role of *S. chartarum* in pulmonary hemorrhage needed to be addressed. In response, CDC convened a multidisciplinary internal group of senior scientists (working group) and sought the individual opinions of outside experts. The working group and the outside experts conducted separate reviews of the Cleveland investigation. The working group reviewed background literature, internal CDC documents, and published CDC reports; examined the data set; and interviewed the principal investigators. The external experts reviewed relevant literature, including internal CDC documents and the working group report, and invited additional consultants to address specific topics. The working group and the external consultants each concluded that further work is needed to better describe the clinical problem, its public health impact, and the factors that put infants at risk.[29–30]

Case Identification

The reviewers had concerns about the characterization of the clinical problem as "hemosiderosis." The acute presentation in all ten cases, the narrow age distribution (6 weeks to 6 months), and the absence of iron deficiency suggest that the illness described in the cluster of cases in Cleveland[1,3] is clinically distinct from idiopathic pulmonary hemosiderosis (IPH), the condition to which this cluster was linked.[31] Hemosiderosis (i.e., hemosiderin-laden macrophages in the interstitium and alveolar spaces of the lung) is a pathologic finding indicative of pulmonary bleeding of any type, not a unique characteristic of a specific disease, etiology, or pathophysiologic process.[32–33] Therefore, in referring to the cluster of cases in Cleveland, the working group defined that cluster as acute idiopathic pulmonary hemosiderosis (AIPH) in infants. From the limited clinical and historic information available to the reviewers on cases added to the Cleveland series since the original cluster (D. Dearborn, Case Western Reserve Department of Pediatrics, personal communication, September 1999), the external consultants concluded that some of these additional cases[6], including several identified in a retrospective review of sudden infant death syndrome cases[2], do not conform to the clinical patterns of cases in the original cluster. Both groups of reviewers recognized limitations that precluded drawing conclusions about clinical or etiologic ties to IPH.

Association of AIPH With Household Water Damage and Fungi

Both groups of reviewers concluded that the available evidence does not substantiate the reported epidemiologic

associations—between household water damage and AIPH[3] or between household fungi and AIPH[4]—or any inferences regarding causality. The interpretation of water damage and its association with AIPH was considered to have been hampered by the limited descriptive information, by the lack of standard criteria for water damage, and by the absence of a standard protocol for inspecting and recording information from home to home. Similarly, assessment of exposure to fungi or mycotoxin also was difficult to interpret because the methods did not distinguish between contamination and clinically meaningful exposure. No isolates or serologic evidence of exposure to fungi or mycotoxin were obtained in individual case-infants.

Evaluation of Analysis Methods

Three factors, considered together, contributed to the groups' conclusions that *S. chartarum* was not clearly associated with AIPH:

1. The working group found that the reported odds ratio (OR) of 9.8 for a change of 10 colony-forming units (CFU) per m^3 was statistically unstable and potentially inflated.[4] The estimate was very sensitive to at least three influential steps or strategies in the analysis. First, the mean airborne *S. chartarum* concentrations (CFU/m^3) for each household were calculated incorrectly. Substituting the corrected means reduced the OR by 44% to 5.5. Second, the mean *S. chartarum* value (CFU/m^3) was imputed in one case home.[†] The sample was collected many months after sampling in the other case homes and, along with all other household samples collected at the same time, produced unusually heavy growth of non-*Stachybotrys* fungi, suggesting important differences in sampling technique, laboratory procedure, or environmental conditions at the time of the sampling. Exclusion of this household from the analysis[§] and correcting the means reduced the OR to 1.9. Third, matching on age in a small data set created an unstable OR. Subject age would not be expected to influence concurrent measurements of airborne fungi and did not correlate with the mean *S. chartarum* CFU/m^3. Therefore, the strategy to match cases and controls based on age was unnecessary and potentially misleading. Analysis without the matching variable reduced the OR from 9.8 to 1.5.
2. Although the methods specified that sampling be done in a blinded manner[4], one investigator correctly inferred the identity of many case homes and wanted to be certain to identify culturable fungi in these homes if they were present. As a result, the investigator collected twice the number of air samples from case homes as were collected from control homes. In addition, investigators used aggressive, nonstandardized methods to generate artificial aerosols for sampling (e.g., vacuuming carpets and pounding on furnace ducts and furniture[4]), increasing the potential for differential exposure assessments of cases and controls if sampling were conducted in an unblinded manner.
3. Among homes classified as water damaged, the presence of any culturable airborne *S. chartarum* was identified in similar percentages of case and control homes (four of eight compared with three of seven) (CDC, unpublished data, February 1997). Although the numbers were small, this provided little evidence of a difference in the presence of airborne *S. chartarum* between water-damaged case and control homes. If the classifications of water damage were correct, this would suggest that water damage, or an unrecognized correlate of water damage, may be confounding any perceived association with *S. chartarum.*

Overall, the reviewers concluded that on the basis of these limitations the evidence from these studies was not of sufficient quality to support an association between *S. chartarum* and AIPH. In addition, the reviewers noted that evidence from other sources supporting a causal role of *S. chartarum* in AIPH is limited. First, AIPH is not consistent with historic accounts of animal and human illness caused by *S. chartarum* or related toxigenic fungi. Second, clusters of AIPH have not been reported in other flood-prone areas where growth of *S. chartarum* or other toxigenic fungi might be favored. Third, the mold-disease association observed in the Cleveland investigation was not observed in the investigation of a similar cluster in Chicago (*34*; CDC, unpublished data, May 1997).

Reported by: Office of the Director, CDC.

Editorial Note: On the basis of the findings and conclusions in the reports of the CDC internal working group and the individual opinions of the external consultants, CDC advises that conclusions regarding the possible association between cases of pulmonary hemorrhage/hemosiderosis in infants in Cleveland and household water damage or exposure to *S. chartarum* are not substantiated adequately by the scientific evidence produced in the CDC investigation.[2–4] Serious shortcomings in the collection, analysis, and reporting of data resulted in inflated measures of association and restricted interpretation of the reports. The associations should be considered not proven; the etiology of AIPH is unresolved.

As a result of the reviews, CDC will implement the following:

1. CDC will continue to investigate cases of AIPH in infants, particularly when clusters of cases can be identified.
2. CDC will continue to consider possible associations between AIPH and many

(continued on page 22)

[†] An imputed value, 4 CFU/m^3 (half the limit of detection divided by the number of plates), was used because colonies were detected on one or more of the plates, but were too few to count on the final platings and, therefore, recorded in the laboratory record as 0 CFU/m^3.

[§] The working group's reported reanalysis used the value originally coded in the laboratory record (0 CFU/m^3). The result was identical to that obtained by excluding the household from the analysis.

(continued from page 21)

possible etiologies, including household water damage or exposure to environmental hydrophilic fungi/molds such as *S. chartarum.* Standardized protocols will be recommended for data collection and environmental assessment.

3. CDC will assist in implementation of surveillance for individual cases or clusters of cases of AIPH in infants.
4. In collaboration with pediatric pulmonary specialists and with state and local health officials, a consistent standard surveillance case definition will be developed for reporting.
5. As part of future CDC investigations, CDC will enhance sampling and laboratory analytic methods to improve assessment of environmental exposures to molds/fungi.

Copies of the report of the working group and a synthesis prepared by CDC of the reports individually submitted by the external experts can be accessed at **http://www.cdc.gov/od/ads**, then click on "Pulmonary Hemorrhage/Hemosiderosis Among Infants."

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LATE BREAKERS

☞ **Emergency Rule Changes**—The Missouri Department of Health has promulgated emergency amendments to the following rules:

- 19 CSR 20-20.010, Definitions Relating to Communicable, Environmental and Occupational Diseases;
- 19 CSR 20-20.020, Reporting Communicable, Environmental and Occupational Diseases;
- 19 CSR 20-26.030, Human Immunodeficiency Virus (HIV) Test Consultation and Reporting;
- 19 CSR 20-26.040, Physician Human Immunodeficiency Virus (HIV) Test Consultation and Reporting.

In addition, the Department is rescinding 19 CSR 20-20.080, Duties of Laboratories, and promulgating an emergency rule of the same name and number. **Correction from the March-April 2000 issue of the *Missouri Epidemiologist***: The emergency amendments/ rule became effective on June 15, 2000. They were published, along with an amendment to 19 CSR 20-26.070, Notification of Results of Court-Ordered HIV Testing of Sexual Offenders, on July 3, 2000 in the *Missouri Register*. All proposed rule changes have a 30-day comment period as part of the rulemaking process. The *Missouri Register* may be accessed through the Missouri Secretary of State home page at **http://mosl.sos.state.mo.us/moreg/moreg.htm**.

☞ **Revised Influenza Immunization Recommendations for 2000–2001**—The Centers for Disease Control and Prevention (CDC) and the Advisory Committee on Immunization Practices (ACIP) issued revised recommendations for influenza immunization for the 2000–2001 season. The recommendations were published in the June 30 *MMWR*. You can access the most recent issues of the *MMWR* at **http://www2.cdc.gov/mmwr/**. If you do not have access to the internet and would like a hard copy of the information, please contact the Section of Vaccine-Preventable and Tuberculosis Disease Elimination at (800) 699-2313 to request a copy.

☞ The Section of STD/HIV/AIDS Prevention and Care Services web pages have been updated. These web pages contain information on HIV/AIDS care programs, STD/HIV prevention programs, HIV counseling and testing sites, the STD manual, informational links, etc. The web pages can be accessed at **http://www.health.state.mo.us/sshapcs/SSHAPCS.html**. For more information, please contact the Section of STD/HIV/AIDS Prevention and Care Services at (800) 359-6259.

Tickborne Disease Summary – 1999

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Office of Surveillance

Ticks of Missouri

Missouri, with its natural climatic conditions of heat and moisture, is an ideal ecological setting for an abundance of tick species. The ticks usually found in Missouri are:

- *Amblyomma americanum* or Lone Star Tick—Considered the primary vector of tularemia in Missouri.
- *Amblyomma maculatum*—Considered a probable vector of tularemia and possibly Rocky Mountain Spotted Fever (RMSF) in Missouri.
- *Dermacenter variabilis* or American Dog Tick—Considered the primary vector of RMSF in Missouri.
- *Rhipicephalus sanguineus* or Brown Dog Tick—Considered the vector of ehrlichiosis in dogs in Missouri. At one time considered a vector of ehrlichiosis in humans, but this theory has not been proven.
- *Ixodes scapularis* or Deer or Wood Tick—Considered the possible vector of borreliosis in Missouri.

While the above ticks are thought to be the prime vectors of specific diseases, it does not mean, for example, that *Amblyomma americanum* could not transmit RMSF, ehrlichiosis or a *Borrelia* species. From a purely scientific perspective, if a certain species of tick has the anatomical and physiological capabilities to transmit a disease, it could be assumed that this species could be capable of transmitting another disease. Indeed this does sporadically happen. *Amblyomma americanum* has the capability to transmit tularemia and RMSF. It has been successfully infected with *Borrelia burgdorferi* in the laboratory and found to transmit the organism. However, it did not remain infected. The role of this tick in the transmission of borreliosis in nature is not known.

In nature there are many variables that affect a specific organism, the ecology of each tick species, and the environment that make a given species a viable vector of a certain disease. Unfortunately, not all of these factors are known or understood. What is known is that a human is not the natural host for any tick. The above-mentioned ticks may bite humans as a means of last resort or of favorable opportunism. Since humans are not the normal host, the *Amblyomma* and *Dermacentor* species must spend four to six hours acclimating to the human host prior to taking a blood meal and thus potentially transmitting the disease. The *Ixodes* species must acclimate for 12–20 hours to the human host prior to taking a blood meal. So during the period of acclimatization, although the tick may be attached by inserting its mouthparts into the skin, it does not start a blood meal, and consequently, cannot regurgitate the organism into the new host.

Of the millions of vector ticks in nature, only a small percent are likely to be infected. In population studies of ticks, if three to five percent are found to be infected with a disease organism, it is considered high. Thus, most ticks are not carriers of disease, and testing individual ticks for disease organisms is usually not productive or cost effective.

Tick feeding activity does produce host reactions caused by the ticks' salivary fluids and toxins, and skin lesions that may occur are susceptible to secondary bacterial infections. This local reaction at times can be very severe.

Epidemiology of Tickborne Diseases

RMSF accounts for 90 percent of the rickettsial diseases that occur annually in the United States. During the 1980s, approximately 50 deaths per year in the United States were attributed to RMSF. An endemic focus for RMSF exists in Missouri, Arkansas, Oklahoma and Texas. In 1999, 16 cases of RMSF were reported in Missouri compared to five cases in 1998. Over the preceding ten-year period (1989–1998), the highest number of cases (48) occurred in 1989, and the lowest number of cases (5) occurred in 1998. The ten-year median (1989–1998) is 24 cases per year. No human deaths due to RMSF were reported in Missouri during 1999, although five deaths have been attributed to this disease since 1989.

Tickborne Disease Alert

Due to the mild winter and early spring, there is an abundance of ticks in Missouri this year. The Missouri Department of Health has already received a number of reports of tickborne diseases.

Patients with a tickborne illness may complain of fever, headache, myalgia, nausea, vomiting or malaise. A petechial or erythema migrans rash may also be present. Clinicians are asked to consider tickborne syndromes in their differential diagnosis of febrile illness with headache, especially if there has been a recent tick exposure. Patients with tickborne disease should be treated with an appropriate antibiotic.

Rocky Mountain spotted fever, ehrlichiosis, tularemia and Lyme disease are reportable to the Missouri Department of Health. For additional information, contact the Section of Communicable Disease Control and Veterinary Public Health at (800) 392-0272.

Tularemia is enzootic in animals in Missouri. In addition to tickborne transmission, this disease can be spread by many other routes, including ingestion, inhalation, and contamination of skin and mucous membranes with infectious materials. In 1999, 19 cases of tularemia were reported in Missouri, compared to 12 cases in 1998. Over the preceding ten years, the highest number of cases (44) occurred in 1991, and the lowest number of cases (9) occurred in 1996. The ten-year median for this period is 24.5 cases per year. No human deaths due to tularemia were reported in Missouri during 1999, although four deaths have been attributed to this disease since 1989.

Missouri continues to account for the majority of ehrlichiosis cases reported nationally, with central Missouri being the epicenter. In 1999, 56 cases of ehrlichiosis were reported in Missouri, compared to 12 cases in 1998. All human cases prior to 1999 were considered to be human monocytic ehrlichiosis (HME). In 1999, in addition to 52 cases of HME, four cases of human granulocytic ehrlichiosis (HGE) were reported. Over the preceding ten years, the highest number of cases (32) occurred in 1996, and the lowest number of cases (11) occurred in 1995. The ten-year median is 16 cases per year. One human death due to ehrlichiosis was reported in Missouri during 1999. Another individual died in 1999 due to "rickettsial illness" which most likely was an ehrlichiosis infection. Six deaths have been specifically attributed to this disease since 1989.

Borreliosis is a serious vectorborne disease in the United States. Borreliosis is a general term which includes both Lyme and Lyme-like illness, as both are thought to be caused by *Borrelia* organisms. Ninety percent of all cases are reported from the northeastern United States. In 1999, 72 cases of borreliosis were reported in Missouri that met the surveillance case criteria for Lyme disease set by the Centers for Disease Control and Prevention (CDC) and the Council of State and Territorial Epidemiologists (CSTE). Twelve cases of borreliosis were reported in Missouri during 1998. Over the preceding ten years, the highest number of cases (207) occurred in 1991, and the lowest number of cases (12) occurred in 1998. The ten-year median is 105 cases per year. No human deaths due to borreliosis were reported in Missouri during 1999, although two deaths have been attributed to this disease since 1989.

Human cases of the diseases noted above all increased from 1998 to 1999 in Missouri. However, all remained below their respective ten-year medians with the exception of ehrlichiosis. A portion of these increases can be attributed to better awareness on the part of medical providers, health agencies, and the general public concerning the threat of tickborne illnesses across the state. Also, diagnostic tools are being developed that are faster, less expensive, and more sensitive than their predecessors. For example, portions of the Missouri medical community collaborated with CDC during 1999 to enhance the detection of ehrlichiosis and borreliosis using techniques such as polymerase chain reaction (PCR) testing.

Prevention of Tickborne Diseases

Persons whose occupations, pastimes, or home environments place them at risk for these diseases should be instructed to:

- Wear light-colored clothing covering legs and arms.
- Tuck pants into socks or boots and apply tick repellent (permethrin to clothing, DEET-containing repellant to skin). Recommendations to use chemicals should include emphasis on following label directions pertaining to age restrictions, method of application, frequency of use, etc.
- Search total body for ticks every 3–4 hours; remove ticks immediately without crushing.
- Minimize tick populations around residential properties by removing potential hosts (e.g., rodents, stray animals), habitat modification (e.g., mowing), and chemical control as a last resort.
- De-tick dogs and cats to minimize exposure to family members.
- Seek medical attention if fever or illness develops soon after a tick bite or exposure to a tick-infected area.

Why Reporting is Important

Disease surveillance cannot be accomplished by any single group. In essence, it is the compilation of contributions by health care providers, veterinarians, patients, hospital and medical communities, and local, state and national public health agencies.

Disease reporting is an important component of health care. Analyzing disease occurrence by person, place and time as well as studying the characteristics of the disease and its effect on the population are vital steps in the process of implementing and revising prevention activities to protect the community. Knowing geographically where specific diseases are occurring and in what populations is important information for prevention. This information also alerts physicians and other providers to new or emerging diseases that may be appearing in their patient populations. In addition, vectorborne diseases recognized in a specific location can be controlled to prevent further disease spread.

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Tickborne Diseases Web Sites

Centers for Disease Control and Prevention: Human Ehrlichiosis in the United States
http://www.cdc.gov/ncidod/dvrd/ehrlichia/Index.htm

Centers for Disease Control and Prevention: Lyme Disease
http://www.cdc.gov/ncidod/dvbid/Lymeinfo.htm

U.S. National Library of Medicine: Tularemia
http://medlineplus.adam.com/ency/article/000856.htm

1999 Mosquitoborne Disease Surveillance Program

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Office of Surveillance

The Department of Health conducted surveillance programs for St. Louis (SLE), Western equine (WEE), Eastern equine (EEE), and LaCrosse (LAC) encephalitis during the 1999 mosquito season. The following active surveillance systems were operational during that period:

- Active Surveillance for Human Cases of Disease
- Active Surveillance for Equine Cases of Disease
- Active Surveillance for Arbovirus Activity in Wild Birds
- Active Surveillance for Arbovirus Activity in Mosquitoes

Active Surveillance for Human Cases of Disease

Human arbovirus surveillance activities consisted of standard reporting by physicians in addition to statewide telephone contact with approximately 88 pre-designated key hospitals on a weekly basis through the sentinel active surveillance system. No cases of human arboviral encephalitis were detected in Missouri last year.

Active Surveillance for Equine Cases of Disease

Thirteen veterinarians throughout the state were contacted by telephone on a weekly basis. All reports indicated no arboviral activity in horses in Missouri in 1999.

Active Surveillance for Arbovirus Activity in Wild Birds

Trapping of wild birds began on June 3 and concluded on October 15, 1999 via a cost-reimbursement contract with the United States Department of Agriculture–Wildlife Service. Blood specimens from a total of 1,003 wild birds, comprised primarily of House Sparrows (*Passer domesticus)*, were collected. Bird collection sites were chosen from the following 14 counties: Boone, Callaway, Cape Girardeau, Clay, Cole, Daviess, Jackson, Lawrence, Lewis, Marion, Montgomery, New Madrid, St. Charles, and St. Louis. Japanese mist nets were deployed at locations in close proximity to livestock and human activity (e.g., horse stables, dairy farms, hog lots, sheep farms). Collections from each geographic area were made at approximately two- to three-week intervals. Specimens were sent to the Veterinary Medical Diagnostic Laboratory at the University of Missouri–Columbia under a contract with the Department of Health and tested for SLE and WEE. Enzyme linked immunosorbent assay (ELISA) techniques designed for detection of IgM antibody specific for the above viruses were used. Suspect positives were submitted to the Centers for Disease Control and Prevention (CDC) at Fort Collins, Colorado for confirmation. Blood samples from three sparrows captured in the Kansas City area were reactive for SLE virus.

Active Surveillance for Arbovirus Activity in Mosquitoes

Mosquito collections were conducted in the eastern Missouri counties of Cape Girardeau and St. Louis and the city of St. Louis. Because these areas were most devastated by the 1993–95 floods, they serve as an excellent representative of the mosquito ecological set. Adult mosquito collections varied by site, but as a whole began on June 1, 1999 and terminated on September 9, 1999. Trapping was accomplished with CO_2 baited CDC and EVS Light Traps, Reiter Gravid Traps, and hand collection at selected resting stations by aspirator.

The Virology Laboratory at Southeast Missouri State University assayed potential vector mosquitoes for SLE, WEE, EEE, and LAC antigens by antigen capture ELISA. Pools included approximately 21,008 specimens of *Aedes albopictus, Aedes triseriatus, Coquillettidia perturbans,* and *Culex pipiens.* *Aedes albopictus* and *Coquillettidia perturbans* were tested for EEE, *Aedes albopictus* and *Aedes triseriatus* were tested for LAC, and *Culex pipiens* complex (CPC) mosquitoes were assayed for SLE and WEE. A total of 961 pools of mosquitoes were tested. All tests were negative, indicating that arboviral activity was not occurring or could not be detected in mosquitoes in these areas.

CPC mosquitoes comprised 20,436 (97%) of the 21,008 vector specimens collected in 1999. However, the number of CPC mosquitoes collected that year was less than in preceding years. In Cape Girardeau County, fewer CPC mosquitoes were collected in 1999 than in each of the years from 1994 through 1998, and the number of mosquitoes per collection (collection index) was lower in 1999 compared to the previous five years. The same sites, baits, and traps were used as in 1998, but the collection index in 1999 (34.2) was less than one-half of the 1998 level (69.7). Similar findings were observed in St. Louis County and City. In St. Louis County, the number of CPC mosquitoes trapped and the collection index for 1999 were less than each of the previous five years. In St. Louis City, the number of CPC mosquitoes trapped and collection index for 1999 were exceeded only once (1997) during the period 1994–1998.

Obviously, the lower the number of vector mosquitoes, the less chance there is for disease transmission. However, monitoring the relative number of mosquitoes from year to year is not a foolproof method for predicting disease burden. Other factors come into play, such as immune status of reservoirs and human hosts, reservoir density, and of course, whether or not the virus is present. Also, predicting mosquito density based on rainfall totals is very tricky. Normally, very wet summers are associated with increased mosquito populations, but actually, hot, dry periods can facilitate mosquito breeding. As water evaporates

from breeding sites, they become more nutrient rich and are capable of supporting greater mosquito populations. If the sites dry up entirely (which occurred in many areas of Missouri last year), then mosquito populations decrease. If mid and late summer rains come along (as happened in New York City last year), then mosquito populations surge and the potential for arboviral transmission increases accordingly.[1]

Arbovirus Surveillance During 2000

The routine surveillance activities described above provide an effective framework that can be quickly expanded in the face of public health threats such as floods or the introduction of new pathogens. Surveillance activities conducted during 2000 will be enhanced by:

- Collecting blood specimens from wild birds in up to 16 (instead of 14) counties. Counties covered under this program will be slightly modified to ensure optimum coverage with respect to population centers and disease threats.
- Using the test for SLE virus as a screen for West Nile Virus when testing bird blood specimens and pools of mosquitoes. Samples with suspect test results will be sent to CDC for confirmation.
- Testing mosquito pools directly for West Nile Virus when specific reagents become available from CDC.
- Assisting cities and counties that have mosquito trapping programs in having specimens tested for arboviruses at no cost (other than shipping) under the Department of Health's existing contract with Southeast Missouri State University. The number of specimens that can be tested is limited, and arrangements for testing must be made through the department.

REFERENCE:

1. Personal communication, Christina L. Frazier, PhD, Southeast Missouri State University, May 22, 2000.

New Tuberculosis Recommendations

The American Thoracic Society (ATS) and the Centers for Disease Control and Prevention (CDC) have released new recommendations for targeted tuberculin skin testing and the treatment of latent tuberculosis infection (LTBI), and revised standards for the diagnosis and classification of tuberculosis (TB). The changes from prior recommendations include:

- Emphasis on targeted TB skin testing among persons at high risk for recent TB infection or clinical conditions that increase the risk for TB disease.
- The LTBI treatment regimen of INH for nine months for HIV-negative adults is considered optimal; however, INH for six months is still acceptable.
- For patients who cannot tolerate INH, a two-month regimen of rifampin/pyrazinamide or a four-month regimen of rifampin are also acceptable.
- Routine baseline and follow-up laboratory monitoring is not needed in most persons with latent TB infection, except for those with HIV infection, pregnant women (or those in the immediate postpartum period), and persons with chronic liver disease or those who use alcohol regularly. All patients on INH need monthly evaluation for signs and symptoms of hepatitis, and instructions to call the health department immediately should they develop signs and symptoms between assessments.

The new recommendations are described in the following ATS and CDC joint statements:

✓ **Targeted Tuberculin Testing and Treatment of Latent Tuberculosis Infection**

✓ **Diagnostic Standards and Classification of Tuberculosis in Adults and Children**

The web versions of the statements are available at **www.cdc.gov/nchstp/tb/** or **www.thoracic.org/statementframe.**

CDC has also released the **Core Curriculum on Tuberculosis, 4th Edition, 2000**, which is available at **www.cdc.gov/nchstp/tb/** for viewing.

To order hard copy versions of these materials you can access the CDC's on-line order form at **www.cdc.gov/nchstp/tb** or call the CDC Voice and FAX Information System (recording) toll free at (888) 232-3228.

If you have questions about the recommendations, please call the Section of Vaccine-Preventable and Tuberculosis Disease Elimination, Missouri Department Health at (800) 611-2912

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The Managing Editor is H. Denny Donnell, Jr, MD, MPH, State Epidemiologist. Production Manager is Diane C. Rackers. Questions or comments should be directed to (573) 751-6128 or toll free (800) 392-0272.

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Upcoming Conference

Emerging Infections of the Central States (EICS)

announces its

Second Annual Conference

October 27 and 28, 2000
St. Luke's Hospital of Kansas City
Kansas City, Missouri

EICS, a region-wide health care organization formed to study Lyme disease and other emerging infectious diseases in Missouri and neighboring states, will hold its Second Annual Conference at St. Luke's Hospital of Kansas City in Kansas City, Missouri on Friday, October 27 and Saturday, October 28. Presentations by physicians on various topics will be open to the professional medical community for CME credit on Friday, October 27, and to the medical community and the general public on Saturday, October 28. Admission will be charged.

The recently formed and growing organization includes practicing physicians from across Missouri and Kansas, academic physicians and scientists from the University of Missouri and public health officials from the Missouri Department of Health. The organization is open to interested health care professionals and scientists in the central states (Arkansas, Illinois, Iowa, Kansas, Missouri, Oklahoma, Nebraska and South Dakota).

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